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HOUSATONIC RIVER FLOOD CONTROL

HOP BROOK DAM & RESERVOIR

HOP BROOK, CONNECTICUT

DESIGN MEMORANDUM NO. 9

PRELIMINARY PLAN FOR RESERVOIR DEVELOPMENT
(PART OF THE MASTER PLAN)



U.S. Army Engineer Division, New England
Corps of Engineers Waltham, Mass.

MARCH 1964

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND

CORPS OF ENGINEERS

424 TRAPELO ROAD

WALTHAM 54, MASS.

ADDRESS REPLY TO:
DIVISION ENGINEER

REFER TO FILE NO.

NEDED-R

9 March 1964

SUBJECT: Design Memorandum No. 9, Preliminary Master Plan for
Reservoir Development - Part of the Master Plan for Hop
Brook Reservoir, Naugatuck River Watershed, Housatonic River
Basin, Connecticut

TO: Chief of Engineers
ATTN: ENG CW-O
Washington, D.C.

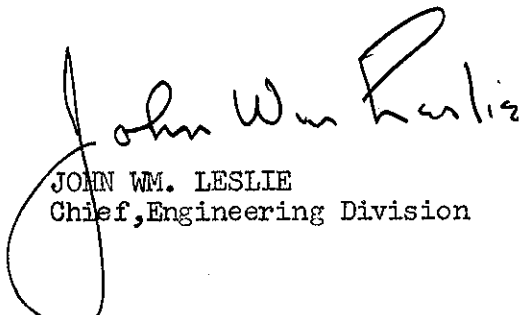
1. Submitted for review and approval are five (5) copies of
subject memorandum, together with a copy of this letter bound in each
copy of the memorandum, in accordance with EM 1110-2-1150.

2. The plan has been initiated to provide for maximum utilization
of the reservoir by the public consistent with the resources of the
area and the authorized purpose of the project.

3. Approval is requested.

FOR THE DIVISION ENGINEER:

1 Inc. (quint)
Des. Memo No. 9
Hop Brook Reservoir


JOHN WM. LESLIE
Chief, Engineering Division

BIBLIOGRAPHY OF DESIGN MEMORANDUM

HOP BROOK DAM AND RESERVOIR

<u>Design Memo No.</u>	<u>Title</u>	<u>Submission Date</u>	<u>Approved</u>
I	Hydrology	7 Feb 64	
II	Site Geology		
III	General Design		
IV	Real Estate		
V	Relocations		
VI	Concrete Materials	31 Jan. 64	19 Feb 64
VII	Embankments and Foundations		
VIII	Detailed Design of Structures		
IX	Reservoir Development (Prelim.)	9 Mar 64	
IX A	Reservoir Development (Master Plan)		
X	Hydraulic Analysis		

HOUSATONIC RIVER BASIN, CONNECTICUT

DESIGN MEMORANDUM NO. 9

PRELIMINARY MASTER PLAN

FOR

RESERVOIR DEVELOPMENT

PART OF THE MASTER PLAN

FOR

HOP BROOK RESERVOIR, CONNECTICUT

This report, prepared in the Planning and Reports Branch of the Engineering Division, has been coordinated with the Real Estate Division and is recommended for approval.


JOSEPH M. GEOGHEGAN
Chief, Real Estate Division

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PRELIMINARY MASTER PLAN

FOR

RESERVOIR DEVELOPMENT

HOP BROOK RESERVOIR, CONNECTICUT

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R/26 Mar 64

1. INTRODUCTION

1-01. Authorization. The flood protection plan for the Housatonic River Basin, including Hop Brook Dam and Reservoir, was authorized by the Flood Control Act, approved 14 July 1960 (Public Law 86-645, 86th Congress).

An interim report dated 30 June 1958 and printed as House Document No. 372, 86th Congress, 2nd Session, recommended that the authorized plan for flood control in the Housatonic River Basin be modified to provide for construction of the following flood control dams and reservoirs: Northfield Brook, Branch Brook (Black Rock), Hancock Brook and Hop Brook.

Authorization for development and use of the reservoir area for public recreational and other purposes is contained in Section 4 of the Flood Control Act approved 22 Dec 1944, as amended.

This preliminary plan for reservoir development and management has been prepared in accordance with EM 1130-2-302, Planning and Administration of Project lands and Waters, and related manuals.

1-02. Scope of Report. This report presents a preliminary plan to serve as a guide for a subsequent comprehensive program for the development, management and use of Hop Brook Reservoir for public purposes which are compatible with the authorized project purposes. Contained in the report is a description of the project, factors affecting recreational activities, sites selected for public use and access, views of other agencies, and preliminary estimates of cost. It is intended that this plan will be flexible so that adjustment may be made to it as changing conditions may warrant.

1-03. Maps. The maps incorporated in the report depict the geographic area in which the project is located, public recreation areas in the vicinity of the project, reservoir features and the proposed development plan. The reservoir map is at a scale of 1"=400 feet. Additional detailed topography will be required in the development areas.

II. DESCRIPTION OF AUTHORIZED PROJECT

2-01. Purpose. The Reservoir has been authorized as a flood control project which will include a permanent conservation pool provided as a mitigation measure for damages which would otherwise be caused by the project to the recreational and fish and wildlife resources of the area.

The permanent pool will be located in the confines of a narrow scenic valley and will provide a desirable multi-use area for public recreation. The surface area at elevation 310 feet m.s.l. will contain about 21 acres, and the maximum depth of the pool will be about 18 feet. It will be about 2200' in length with a maximum width of 800 feet. This will provide a valuable recreation resource including the fish and wildlife features. The present location of Whittemore Glen State Park and Bridle Trail, adjacent to the reservoir area, will enhance the area for a wide range of recreation activities. The popularity and attraction of water based activities will increase the recreational potentials of the presently undeveloped resources.

2-02. Location. Hop Brook Dam will be located in the State of Connecticut on Hop Brook, a tributary of the Naugatuck River, which in turn is a principal tributary of the Housatonic River. The dam site is about 1.4 miles above the confluence of Hop Brook and the Naugatuck River and is situated on the Waterbury-Naugatuck town line. The town line between Middlebury and Waterbury follows the length of the reservoir, which extends about 1.6 miles upstream when filled to spillway crest at elevation 364 ft. m.s.l. The location of the reservoir site is shown on Plate No. 1.

2-03. Accessibility. The reservoir area is readily accessible over a good highway system which is constantly expanding to serve the 2.4 million people who reside within an hour's drive, (40 miles) of the project. Interstate Route 84, a major east-west road between Hartford, Danbury and southern New York State, passes within a quarter of a mile of the reservoir area with an interchange installed at State Route 63, just north of the project area. State Route 63 will be relocated around the west side of the reservoir, and provisions will be made for access from the road to the reservoir over old Route 63. State Route 8 follows the Naugatuck River valley passing about one mile east of the area. Bristol Street and State Route 63 pass through the permanent pool and segments will be abandoned. These segments above the permanent pool will provide access into the recreation areas. The relocated State Route 63 will provide access to the dam. Segments of Farm Road and Country Club Road will be raised. State Route 188 will provide access from the Town of Middlebury.

2-04. Project Status. It is anticipated that construction will be initiated during the third quarter of FY 1965, with completion scheduled for the last quarter of FY 1967.

2-05. Pertinent Data. The dam will be an earth-fill structure 500 feet in length with a maximum height of 97 feet above the stream bed. The top of the dam will be at an elevation 381.0 feet m.s.l. It will have a 200-foot concrete weir chute spillway

located in a saddle about 1200 feet northeast of the left abutment of the dam. Crest elevation is 364 feet m.s.l. An earth dike about 400 feet in length and 30 feet high will be located on the left side of the channel so as to contain the discharge within the spillway.

The outlet works will consist of a 3'x5' cut and cover concrete conduit founded on rock in the left abutment of the dam. A gate-control tower with two 3' x 4' gates will be located at the upstream toe of the dam.

The capacity of the reservoir at spillway crest will be 6,970 acre-feet which is the equivalent of a runoff of 8.00 inches from the drainage area of 16.4 square miles above the dam. When filled to spillway crest, the reservoir will be about 1.6 miles long with a surface area of about 270 acres.

About 1.8 miles of Connecticut Route 63, a bituminous surfaced State highway, will be relocated above the guide-taking line to the west of the reservoir area. This new highway will depart from the present Route 63 at a point about 2000 feet below the dam site and will swing back into Route 63 at a point about 700 feet south of the junction of Route 63 and Country Club Road. Bristol Street will be abandoned in the reservoir area.

A conservation pool will be created at elevation 310 feet m.s.l. It will have a surface area of 21 acres and a maximum depth of about 18 feet. Control of pool levels will be effected by a stop log structure.

In addition to providing an improved fishery, boating and scenic resource, this pool will prevent freezing of the gates during the winter.

2-06. Land Acquisition. Land for the project will be acquired in accordance with the policy outlined in EM 405-2-150, as amended, including Change 11 dated 31 May 1963. Consideration is being given to the establishment of the minimum guide taking line for the easterly portion of the reservoir at 300 feet horizontally from the spillway crest elevation of 364 feet m.s.l. For the westerly and northerly portions, a taking line at elevation 369 feet m.s.l. is being recommended. Fee title will be acquired to lands within the construction and work areas and to exterior property bounds where required fee acquisition will effectively eliminate access to remainders based on sound real estate practice. Should any part of the existing Whittimore Glen State Park within the reservoir not be needed for construction purposes, a flowage easement will be taken in accordance with expressed desires of officials of the State of Connecticut.

The total area to be acquired is estimated at 525 acres. This area is adequate for access and use of the resources of the reservoir by the public without additional lands for this purpose. The anticipated taking line is shown on Plate No. 3. A Real Estate Map will be included in the Master Plan.

III. FACTORS AFFECTING RECREATIONAL ACTIVITIES

3-01. Existing Public Recreation Areas. The states within an hour's drive (40 miles) of the project provide park, forests and other recreation areas for the public. The development of these vary considerably. The addition of Hop Brook Reservoir will significantly supplement these areas, especially in the provision of a public water area where an existing deficiency is recognized. Plate No. 2 shows the location of existing public recreation areas and available uses.

3-02. Population. The number of persons residing within 40 miles of the reservoir has been recorded at 2.4 million by the 1960 United States census. 1.3 million resided within a 25 mile radius and a population of 131,500 persons resided within the three towns, Waterbury, Middlebury and Naugatuck in which the project is located. Generally, the growth rate in this part of Connecticut represents a 25 per cent increase over the 1950 census.

3-03. Anticipated Public Use. Based upon a comparative analysis of attendance records at other similar flood control projects in this Division, and with consideration of other nearby resources, population, and recreational trends, it is estimated that the project will attract about 70,000 visitors within three years after completion. This estimate is made with allowance for the fact that swimming will not be an attraction until pollution abatement measures are completed.

3-04. Project Resources. The Hop Brook Flood Control Reservoir may impound floodwaters to depths in excess of 72 feet at the dam. The flood control reservoir will be superimposed on the permanent pool. As demonstrated by the hurricane floods of August and October 1955, floodwater storage may occur at any time of the year in the precipitous river basins of New England, but major reservoir operation is most likely to occur in the spring. Experience over the past 25 years in the operation of other flood control reservoirs in New England indicates that the natural resources of the reservoirs are available for uninterrupted use during most of the summer, fall and winter seasons. Experience has further shown that the important benefits accruing from public recreational development and use, fish and game, and forestry management and other uses are compatible with the authorized flood control purpose of these reservoirs. It is therefore concluded that the project is suitable for the development and use as proposed in this preliminary Master Plan.

The reservoir area, with a permanent pool providing opportunities for boating and fishing and a scenically wooded area providing a pleasant atmosphere for picnicking, will be a major attraction to the visiting public in an area of high population concentration and where a dearth exists of such resources in public ownership.

The upstream portion of the reservoir furnishes good cover for small game and can be expected to be popular with hunters. Swimming will be available when pollution abatement measures are undertaken. The provision of basic facilities as proposed in this memorandum, will allow full public use of the resources of the project.

IV. COOPERATING AGENCIES

4-01. Federal Agencies. a. U.S. Department of Health, Education and Welfare. On 7 November 1963 the Regional Office reviewed its preliminary evaluation report on vector problems relating to this project as furnished to this Division on 30 January 1957. No modifications were found necessary. The overall effect of the project upon vector production should be beneficial since it will result in a decrease of the highly annoying floodwater mosquitoes (*aedes vexans*). Should any unexpected problem occur, assistance will be requested from the Connecticut State Department of Health. The report is contained in the General Design Memorandum.

b. U.S. Department of the Interior, Fish and Wildlife Service. The Northeast Region (Region 5) of the Service furnished a conservation and development report dated 25 April 1960 on the fish and wildlife aspects of this project. It was summarized that a permanent pool will mitigate fish and wildlife losses resulting from project construction. A review report dated 27 November 1963 concurred in the original findings and requested further consultations for the purpose of minimizing damages to fish and game habitat resulting from project construction. Comprehensive consideration will be given to this aspect and a full treatment of the subject will be included in the Master Plan.

c. U.S. Department of the Interior, National Park Service. Region Five of this agency, in report dated 24 November 1959, concluded that the proposed conservation pool would appear to mitigate the park and recreational losses caused to the Whittemore Glen State Park by the project provided that sufficient land is acquired to control public access and to provide sites for facilities needed to make the recreation values available for public use. It is considered that the taking of a flowage easement on state park land, except that portion necessary for construction, and the availability and development of the adjacent reservoir lands for public recreational use, satisfies the above conditions. (See Plate No. 3).

d. U.S. Department of Agriculture, Forest Service. Coordination on the forestry resources of the project will be effected with this Service and the State Park and Forest Commission as required by Public Law 86-717 - H.R. 9377. The results will be contained in the Master Plan.

4-02. Agencies of the State of Connecticut. a. Water Resources Commission. The Water Resources Commission of the State has participated in various conferences on development of the resources of the reservoir and concurs in the development contained in this report. The Director of this Commission has served as the coordinator for state and local interests.

b. Board of Fisheries and Game. This agency concurs with the report of the U.S. Fish and Wildlife Service. It is prepared to undertake a fish and wildlife management program under suitable license agreement. This program will be developed for inclusion in the Master Plan.

c. Park and Forest Commission. The Director of this Commission concurs in the proposed public use plan for the project. He notes that a portion of the reservoir lies within the boundaries of the 305 acre Whittemore Glen State Park and he is interested in "having the Corps acquire any non-buildable land adjacent to and lying above the spillway crest elevations so that these properties could be incorporated in future recreational plans of this Commission."

Within the requirements of the authorized project and in accordance with real estate policy as outlined in EM 405-2-150, as amended, a minimal estate will be taken in the state park land. (See paragraph 2-06 and Plate No. 3). This matter will be fully discussed in the Real Estate Design Memorandum.

V. SITES SELECTED FOR PUBLIC USE

5-01. Reservoir Area. The area chosen for initial development is located so as to provide public access and use in the most economical manner, with due consideration to the attractiveness of the surroundings and the possibility of future expansion. Provisions will be made for picnicking, parking, sanitation facilities and access to the permanent pool. Plate No. 3 shows the location of this recreation area.

5-02. Vicinity of Dam. Parking, sanitary facilities, drinking water, and an observation area will be provided as a part of project construction for the accommodation of the visiting public at the dam.

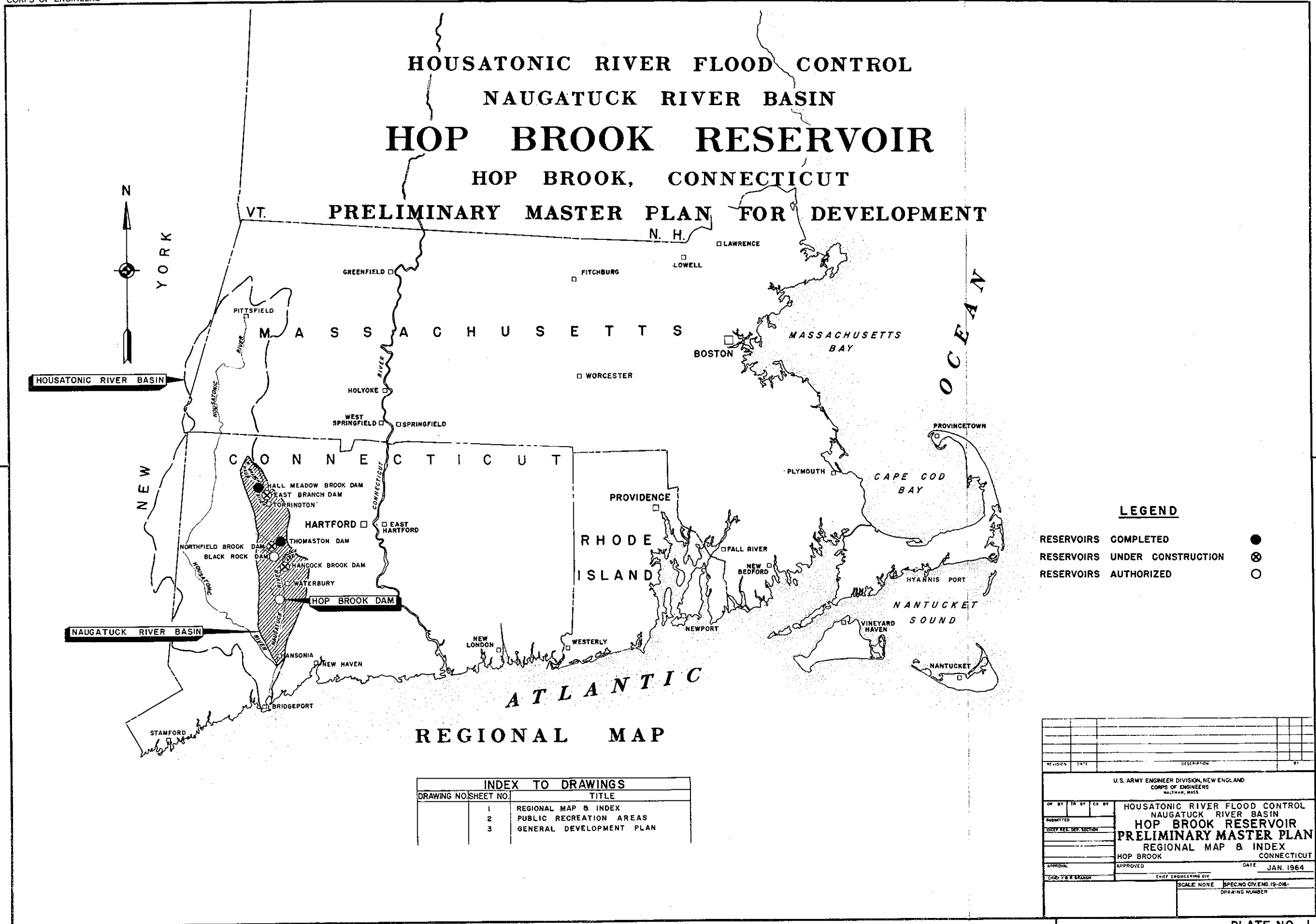
VI. COST ESTIMATE

6-01. Cost Estimate. The preliminary estimate of initial cost is based on development of basic facilities by the Federal Government. These facilities will generally conform to criteria set forth in EM 1130-2-312, including change 1, dated 15 August 1961. A summary of proposed facilities and estimated costs are included in Appendix A.

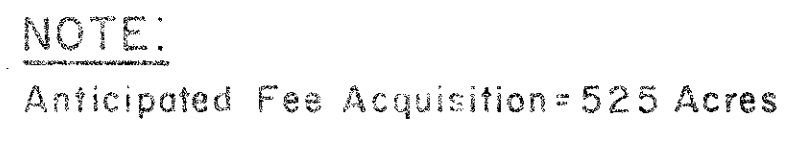
VII. CONSTRUCTION SCHEDULE

7-01. Construction Schedule. The development of the recreation areas will be undertaken at such time as will be in the best interest of the Government with respect to the authorized project construction contract. It is planned to have facilities available for use by the summer season of 1967.

R/26 Mar 64




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SCALE IN FEET

400' 0 400' 800'

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